[7590-01-P]

NUCLEAR REGULATORY COMMISSION

[Docket No. 50-368; NRC-2015-0008]

Entergy Operations, Inc., Arkansas Nuclear One, Unit 2

AGENCY: Nuclear Regulatory Commission.

ACTION: Exemption; issuance.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is issuing an exemption in response to a January 21, 2014, request from Entergy Operations, Inc. (Entergy or the licensee), from certain requirements to perform Type B testing (seal pressure test) of the containment emergency escape air lock doors. This exemption would permit the licensee to perform a door seal contact verification check in lieu of the currently required seal pressure test.

DATES: [INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

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FOR FURTHER INFORMATION CONTACT: Andrea George, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington DC 20555-0001; telephone: 301-415-1081, e-mail: Andrea.George@nrc.gov.

SUPPLEMENTARY INFORMATION:

I. Background.

Entergy is the holder of renewed Facility Operating License No. NPF-6, which authorizes operation of Arkansas Nuclear One (ANO), Unit 2. The license provides, among other things, that the facility is subject to all rules, regulations, and orders of the NRC now or hereafter in effect.

The ANO facility consists of two pressurized-water reactors, Units 1 and 2, located in Pope County, Arkansas.

II. Request/Action.

Pursuant to § 50.12 of Title 10 of the *Code of Federal Regulations* (10 CFR), "Specific exemptions," by letter dated January 21, 2014 (ADAMS Accession No. ML14021A085), as supplemented by letters dated March 17 and September 24, 2014 (ADAMS Accession Nos. ML14077A139 and ML14268A317, respectively), the licensee requested an exemption from certain requirements of 10 CFR Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors." Specifically, the licensee requested an exemption from Option B, Section III.B, Type B testing (seal pressure test) of the ANO, Unit 2, containment emergency escape air lock doors. This exemption would permit the licensee to perform a door seal contact verification check in lieu of the currently required seal pressure test.

Section III.B, Option B, Appendix J, 10 CFR Part 50, defines Type B tests as pneumatic tests to detect and measure local leakage rates across pressure retaining, leakage-limiting boundaries, which include containment emergency escape air lock door seals. Section III.B, Option B, Appendix J, 10 CFR Part 50, also states that these boundaries, such as containment emergency escape air locks, must be pneumatically tested (1) prior to initial criticality, and (2) periodically thereafter at intervals based on the safety significance and historical performance of each boundary and isolation valve to ensure the integrity of the overall containment system as a barrier to fission product release.

The licensee stated that the exemption request is necessary due to the design characteristics of the ANO, Unit 2, containment emergency escape air lock doors, in that the door sealing capability relies, in part, on rising containment pressure to provide sufficient closing

force to produce an effective seal. In order to perform between-the-seals testing for the doors in the absence of containment pressure, a strongback must be installed to simulate this sealing force.

III. Discussion.

Pursuant to 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 50 when: (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security; and (2) when special circumstances are present. Under 10 CFR 50.12(a)(2)(ii), special circumstances include, among other things, when application of the specific regulation in the particular circumstance would not serve, or is not necessary to achieve, the underlying purpose of the rule.

A. Special Circumstances.

Special circumstances, in accordance with 10 CFR 50.12(a)(2)(ii), are present whenever application of the regulation in the particular circumstances is not necessary to achieve the underlying purpose of the rule. The underlying purpose of Type B testing in Section III.B, Option B, Appendix J, 10 CFR Part 50, is to verify containment integrity as a fission product barrier to provide reasonable assurance of public health and safety in the event of a loss-of-coolant accident. The evaluations described in the following sections of this exemption show that the underlying purpose of the regulations is met by the proposed seal contact check for the

ANO, Unit 2, containment emergency escape airlock doors. Specifically, due to the design of the doors at ANO, Unit 2, the currently required between-the-seals testing (for the annulus between the inner and outer emergency air lock doors), if done without the strongback installed, is unable to hold pressure at or near the Technical Specification (TS) required pressure, and so meaningful between-the-seals testing is not possible without installing the strongback or exerting significant closing torque to the door closure mechanism. The seal contact check, where chalk is applied to the air lock door seal face, the door is cycled open and closed, and the chalk outline left is representative of the door seal bead mating with the seal. If the chalk pattern does not show adequate contact, the seals are adjusted and the seal contact test is reperformed until a 360-degree seal results. The seal contact check and seal adjustments (if necessary), the practices for which have been incorporated into ANO, Unit 2, maintenance procedures, ensure that the containment emergency air lock doors are sealing properly and that seal integrity of the doors is maintained. The underlying purpose of Type B testing in Section III.B, Option B, Appendix J, 10 CFR Part 50, is achieved through application of the seal contact check for the air lock doors. Therefore, the special circumstances required by 10 CFR 50.12(a)(2)(ii) for the granting of an exemption exist.

B. Authorized by Law.

This exemption would allow the use of a seal contact check, in lieu of a seal pressure test, to verify the seal tightness of the ANO, Unit 2, containment emergency escape air lock doors. As stated above, 10 CFR 50.12 allows the NRC to grant exemptions from the requirements of 10 CFR Part 50 provided that special circumstances are present. As described above, the NRC staff has determined that special circumstances exist to grant the requested

exemption. In addition, granting the exemption will not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations. Therefore, the exemption is authorized by law.

C. No Undue Risk to Public Health and Safety.

This exemption request is necessary due to the original design of the containment emergency escape air lock at ANO, Unit 2. The air lock consists of a steel cylinder with a circular door at each end, an outer door and inner door, with the inner door being directly in contact with the interior of the containment building. Both of the air lock doors open inward toward the containment building interior, and so, during between-the-seals pressure testing (between the two air lock doors), the increasing pressure tends to more tightly seat the outer air lock door and push the inner airlock door off of its seat. The licensee stated that though each air lock door is fitted with two latching pins, one for the top and one for the bottom, these pins are not designed to provide enough closing force for meaningful between-the-seals testing without a strongback installed. During a postulated design basis event, both air lock doors rely on rising containment building pressure to provide closing force for a sufficiently tight seal in order to constitute a fission product boundary.

In its application, the licensee stated that during trial testing, the annulus between the door seals could not be successfully tested without the door strongback installed, even at pressures as low as 12 pounds per square inch gauge. This indicates that the leak rates for between-the-seals testing on the emergency escape air lock doors cannot meet the acceptance criteria found in Section III.B.1.(c), Appendix J, 10 CFR part 50, without the use of a strongback. The licensee stated that it has taken efforts to improve the test without the use of a strongback, and that these efforts have produced conflicting results. The licensee concluded that a

complete change-out of the inner and outer bulkhead and door assemblies would be required to support incorporating an “O” ring seal design with a 3-pin latching configuration. Based on vendor information, the “O” ring seal design is superior to the flat seal profile design. Consideration was also given to a gear reduction design for the opening and closing mechanism. The licensee stated that while this option would increase sealing forces, there is insufficient evidence to determine whether such a modification would ensure future success with respect to between-the-seals pressure testing.

The licensee stated that in recent years, it has performed significant maintenance and modification activities on the air lock doors with onsite vendor support. By letter dated August 11, 2014 (ADAMS Accession No. ML14218A602), the NRC staff submitted a request for additional information to the licensee regarding whether seal design, seal material, seal shape, and seal operation conditions had been evaluated to address the between-the-seals testing difficulties. In its response dated September 24, 2014, the licensee stated that the following activities have been completed in recent years regarding the air locks: (1) increased door to seal contact by adjusting door settings, (2) designed a torque amplifying device to assist in opening/closing the door due to increasing the contact pressures, (3) replaced door seals every refueling outage, (4) upgraded door locking bolt compression springs to allow for additional closing forces with improved ability to open the doors, (5) replaced locking bolt brackets and pins, and (6) obtained vendor support and expertise to maintain and adjust the door for optimum performance. The licensee also stated that the seal material currently in use is an ethylene-propylene-diamine-monomer, which is the vendor recommended and qualified material. The seals are a square cross-section shape design formed in a continuous circle to fit the bulk head frame seal channel. By design of the channel, the seal shape is limited. In addition, each door is designed with a “nose/sealing bar” that provides a continuous protrusion into the flat-faced

seal for improved sealing contact. These features prevent seal design changes without extensive changes to the design and hardware of the hatch.

In its application, the licensee indicated that the vendor has clearly stated that the ANO, Unit 2, air lock design does not support testing without the use of a strongback and, to meet leak rate limits, the airlock's latching mechanism must generate a high latch contact such that it will maintain a residual compressive load on the gasket greater than the unseating effect produced by the test pressure. Adjustment and/or modification of the latch in this manner defeats the purpose of the emergency escape air lock since excessive human force would be required to open the air lock door in an emergency situation. The licensee provided information regarding two events where personnel or equipment difficulties precluded the air lock doors from being opened or opening as designed. In 2008, after an individual became trapped in the air lock due to being unable to open the door, the licensee installed a torque amplifying device to assist personnel in door opening/closing. In 2012, the air lock outer door required mechanical agitation to open, and it was noted that the 3/4-inch stainless steel latch pins were bent. Based on efforts to date, the licensee has concluded that attempting to apply excessive closing torque to the door necessary to overcome the original design characteristics is inappropriate.

The licensee has investigated the potential of substantial modifications to the air lock doors in order to meet the current seal pressure test requirements and the Occupational Safety and Health Administration's requirements. Beyond the many components previously replaced, along with spring upgrades to help alleviate the excessive force now needed to operate the doors, the licensee has determined complete door replacement (retrofit) would be necessary to resolve the aforementioned issues and have the ability to perform a meaningful between-the-seals pressure test. The licensee stated that vendor proposals for door replacement reflect an

extremely high estimated cost, without any guarantee that such a modification would resolve the issue of air lock seal pressure testing. The cost of pursuing such a modification is unwarranted because no appreciable increase in nuclear or public safety would be realized.

In its application, the licensee stated that past TS surveillance testing for the emergency escape air lock has shown that testing with strongbacks in place is successful; however, the pressure applied by the strongbacks, or the pressure applied to the outer door during the overall air lock pressure test, can cause door seals to take a set that reflects the shape of the seal grooves. With strongbacks installed or test pressure applied to the air lock barrel, the male portion of the door seal (the seal bead) can be pressed into the seal. The seal will remain in this compressed condition for the entire test period, causing the seal to take a set in the seal groove of the air lock bulkhead. After completion of an overall air lock barrel pressure test, both doors must be opened to verify proper seal contact with the door seal bead in order to ensure that the seals rebound to the pre-test condition. During the seal contact check, a seal adjustment may be required after testing because the force of the strongbacks on a given door and/or the force due to the air lock barrel test pressure on the outer door can draw the seal bead on the doors further into the seal groove than what would occur under normal door closure forces.

The seal contact check consists of applying chalk or other viable medium on the seal face and then closing and reopening the emergency escape air lock door. This will result in a pattern in the chalk (or other medium) that is representative of the door seal bead mating with the seal. If the chalk (or other medium) pattern does not show adequate contact, the seals are adjusted in the area of the gap. Following adjustment, the licensee performs a final seal contact check to verify the integrity of the sealing surface. The practice of verifying acceptable seal

contact following performance of the overall air lock leak test and the acceptance criteria for this verification have been incorporated into the ANO, Unit 2, maintenance procedures.

The performance of the door seal contact check has led to the successful completion of subsequent emergency escape air lock full pressure tests since the procedural practice began. In a request for additional information dated August 11, 2014 (ADAMS Accession No. ML14218A602), the NRC staff requested that the licensee provide test results to show the effectiveness of the seal contact check. In its supplement dated September 24, 2014, the licensee provided the test results following seal contact checks for refueling outages from 2008 (2R19) to 2014 (2R23). In its supplement, the licensee stated that the results indicate that performance of the seal contact check is instrumental in the successful completion of subsequent leak testing. In its application, the licensee noted that acceptance criteria for containment building integrated leak rate testing (ILRT) has been met for each ILRT since initial plant startup, indicating that the emergency escape airlock door seals are meeting their design function when exposed to pressure in the correct (accident) direction.

As an alternative to the between-the-seals pressure test of the emergency escape air lock required by Section III.B, Option B, Appendix J, 10 CFR Part 50, the licensee has proposed a final door seal contact verification. This seal performance verification is completed following the full pressure airlock test, after the removal of the inner door strongback, and just prior to final closure of the airlock doors. The requested exemption would not affect compliance with the requirement to perform a full pressure emergency escape airlock test each refueling outage. Based on these results and information provided by the licensee, the NRC staff concludes that the containment building emergency airlock doors at ANO, Unit 2, function as designed using current methods of testing and maintenance, including seal contact checks. The NRC staff further concludes that the seal contact checks performed on the emergency escape airlock door seals ensure that the doors are sealing properly and will perform their design function to limit

radiological release in the case of a postulated accident. Therefore, the NRC staff determined that the between-the-seals testing required by Section III.B, Option B, Appendix J, 10 CFR Part 50, is not necessary to achieve the underlying purpose of the rule for the emergency escape air lock doors, given their current design. Since the above evaluations demonstrate that the underlying purpose of the rule will be met with the seal contact check, the NRC staff concludes that there is no undue risk to the public health and safety.

D. Consistent with the Common Defense and Security.

The licensee's exemption request is to utilize an alternative to the Type B containment emergency escape air lock door seal pressure testing requirement in Section III.B, Option B, Appendix J, 10 CFR Part 50. This exemption request is not related to, and does not impact any security issues at ANO, Unit 2. Therefore, the NRC staff determined that this exemption does not impact, and is consistent with, the common defense and security.

E. Environmental Considerations.

The NRC staff determined that the exemption discussed herein meets the eligibility criteria for the categorical exclusion set forth in 10 CFR 51.22(c)(9) because it is related to a requirement concerning the installation or use of a facility component located within the restricted area, as defined in 10 CFR Part 20, and issuance of this exemption involves no significant hazards consideration, no significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, and no significant increase in

individual or cumulative occupational radiation exposure. Therefore, in accordance with 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the NRC's consideration of this exemption request. The basis for the NRC staff's determination is discussed as follows with an evaluation against each of the requirements in 10 CFR 51.22(c)(9)(i) - (iii).

Requirements in 10 CFR 51.22(c)(9)(i)

The NRC staff evaluated whether the exemption involves no significant hazards consideration using the standards described in 10 CFR 50.92(c), as presented below:

1. Does the proposed exemption involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed change would permit emergency escape air lock door seal leak integrity testing to be performed by a seal contact check in place of the between-the-seals pressure test. The seal contact check will be performed following emergency escape air lock door opening, overall full pressure test of the emergency escape air lock, or air lock door seal contact adjustments. The seal contact test method will result in a continuation of the established practice at ANO, Unit 2, which has provided a high degree of confidence in door seal performance. The performance of the door seal contact test method at ANO, Unit 2, has led to the successful completion of subsequent emergency escape air lock full pressure tests since the procedural practice began. Furthermore, the acceptance criteria for containment building ILRT has been met for each ILRT since initial plant startup, indicating that the air lock door seals are meeting their design function when exposed to pressure in the correct (accident) direction. At Palisades Nuclear Plant, emergency escape air lock door seals which have been inspected in accordance with the proposed methodology have passed subsequent full pressure

emergency escape air lock leakage tests and have not interfered with successful Containment Building ILRT.

Since the proposed methodology can be used to successfully verify door seal condition and contact, the use of this methodology for testing will not cause an increase in the probability of a leaking emergency escape air lock door seal going undetected. The combination of the door seal contact check and the overall full pressure testing of the emergency escape air lock will provide high confidence of the air lock performing its design function under accident conditions.

Therefore, this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed exemption create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed change is associated exclusively with testing of features related to Containment Building integrity. The change affects only the testing methodology of the emergency escape air lock door seals. The proposed testing method does not result in any physical alterations to the plant configuration, no new structure, system, or component (SSC) is added, no SSC interfaces are modified, and no changes to any design function of an SSC or the methods of SSC operation are being made. As the proposed change would not change the design, configuration, or operation of the plant, the change would not cause the Containment Leakage Rate Testing Program to become an accident initiator.

Therefore, this change does not create the possibility of a new or different kind of accident from an accident previously evaluated.

3. Does the proposed exemption involve a significant reduction in a margin of safety?

Response: No.

The proposed change is associated exclusively with testing of features related to Containment Building integrity. The change affects only the testing methodology of the emergency escape air lock door seals. The change is unrelated to an initiator of any accident previously evaluated. The proposed application of a door seal contact check in lieu of a between-the-seals pressure test along with continuation of the overall full pressure test of the emergency escape air lock will continue to provide high confidence that the Containment Building leakage rate criteria for the emergency escape air lock will not exceed the maximum allowable leakage rates defined in the TSs or assumed in the accident analysis.

Therefore, this change does not involve a significant reduction in a margin safety.

Based on the above evaluation of the standards set forth in 10 CFR 50.92(c), the NRC staff concludes that the proposed exemption involves no significant hazards consideration. Accordingly, the requirements of 10 CFR 51.22(c)(9)(i) are met.

Requirements in 10 CFR 51.22(c)(9)(ii)

The proposed exemption would allow containment emergency escape air lock door seal pressure testing to be performed by a seal contact verification test. This change only affects the leakage integrity testing methodology of the door seals, and does not change the frequency at which the testing must be performed. The proposed testing methodology serves the same purpose as the pressure testing required by regulations. Therefore, the proposed alternative testing methodology will not significantly change the types of effluents that may be released offsite, or significantly increase the amount of effluents that may be released offsite. Therefore, the requirements of 10 CFR 51.22(c)(9)(ii) are met.

Requirements in 10 CFR 51.22(c)(9)(iii)

The proposed exemption would allow containment emergency escape air lock door seal pressure testing to be performed by a seal contact verification test. This change only affects the leakage integrity testing methodology of the door seals and has no impact on, or change to, fuel or core design. Therefore, the proposed alternative testing methodology will not significantly increase individual occupational radiation exposure or significantly increase cumulative occupational radiation exposure. Therefore, the requirements of 10 CFR 51.22(c)(9)(iii) are met.

Conclusion

Based on the above, the NRC staff concludes that the proposed exemption meets the eligibility criteria for the categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, in accordance with 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the NRC's issuance of this exemption.

IV. Conclusions.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a), the exemption is authorized by law, will not present an undue risk to the public health and safety, and is consistent with the common defense and security. Also, special circumstances are present. Therefore, the Commission hereby grants the licensee an exemption from 10 CFR Part 50, Appendix J, Option B, Section III.B, Type B testing (seal pressure test) to perform a

seal contact verification test, in lieu of seal pressure testing, for the ANO, Unit 2, emergency escape air lock doors.

This exemption is effective upon issuance.

Dated at Rockville, Maryland, this 12th day of January 2015.

For the Nuclear Regulatory Commission.

Michele G. Evans, Director,
Division of Operating Reactor Licensing,
Office of Nuclear Reactor Regulation.

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